

White River, 26; Minnedosa, 12, 13, 15, 16, 17; Qu'Appelle, 6; Swift Current, 15; Prince Albert, 24; Banff, 16.

Thunderstorms were reported as follows: St. Johns, 23, 31; Halifax, 23, 25; Grand Manan, 17, 22; Bermuda, 12, 14, 20, 22, 23, 26; Yarmouth, 25; Charlottetown, 9, 10; Father Point, 6, 16, 17; Quebec, 4, 9, 13, 16, 17, 22; Montreal, 12, 16, 29; Rockliffe, 3; Toronto, 3, 11, 12, 16, 21, 23, 24; White

River, 4, 5, 11, 20, 28, 31; Ottawa, 16, 29, 31; Port Stanley, 3, 7, 8, 11, 12, 16, 24; Saugeen, 15, 25; Parry Sound, 3, 11, 25, 28; Port Arthur, 28, 31; Winnipeg, 14, 15, 16, 24, 28; Minnedosa, 4, 18, 19, 22; Qu'Appelle, 14; Medicine Hat, 1, 3, 4, 5, 14, 21, 28; Swift Current, 3, 4, 11, 17, 22, 31; Kamloops, 3; Prince Albert, 8, 20; Battleford, 8; Esquimalt, 15; Banff, 2, 3, 8, 11, 19, 21.

## CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division.

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Rainfall is expressed in inches.

**Alabama.**—The mean temperature was 78.7°, or about normal; the highest was 102°, at Pineapple on the 24th, and the lowest, 59°, at Florence on the 24th. The average precipitation was 7.43, or 3.11 above normal; the greatest monthly amount, 17.48, occurred at Alco, and the least, 1.02, at Riverton.—*F. P. Chaffee.*

**Arizona.**—The mean temperature was 81.9°; the highest was 124°, at Fort Mohave on the 10th, and the lowest, 41°, at Fort Defiance on the 11th. The average precipitation was 3.01; the greatest monthly amount, 8.51, occurred at Calabasas, and the least, 0.19, at Yuma.—*W. G. Burns.*

**Arkansas.**—The mean temperature was 79.4°, or 0.6 above normal; the highest was 104°, at Lonoke on the 23d, and the lowest, 55°, at Fayetteville on the 4th. The average precipitation was 4.35, or 1.01 above normal; the greatest monthly amount, 8.42, occurred at Jonesboro, and the least, 1.86, at Conway.—*E. B. Richards.*

**California.**—The mean temperature was 74.5°, or normal; the highest was 124°, at Volcano Springs on the 14th, and the lowest, 23°, at Bodie on the 3d. The average precipitation was 0.02, or 0.03 below normal; the greatest monthly amount, 0.99, occurred at Edgewood, while no rain fell at more than half of the stations.—*W. H. Hammon.*

**Colorado.**—The mean temperature was 66.9°, or 2.3° above normal; the highest was 107°, at Delta on the 14th, and the lowest, 29°, at Wagon Wheel Gap on the 2d, and at Breckenridge on the 10th. The average precipitation was 1.48, or 0.27 below normal; the greatest monthly amount, 3.62, occurred at Yuma, and the least 0.14 at Crook.—*F. H. Brandenburg.*

**Florida.**—The mean temperature was 80.8°, or slightly below normal; the highest was 97°, occurring at several stations on different dates; the lowest was 58°, at St. Andrews Bay on the 7th. The average precipitation was 12.96, or about 6.50 above normal; the greatest monthly amount, 31.26, occurred at St. Andrews Bay, and the least, 5.34, at Sebastian.—*A. J. Mitchell.*

**Georgia.**—The mean temperature was 78.5°, or about normal; the highest was 99°, at Millen on the 25th, and the lowest, 59°, at Diamond on the 13th. The average precipitation was 10.09, or 4.66 above normal; the greatest monthly amount, 28.70, occurred at Fleming, and the least, 2.45, at Greenbush.—*J. B. Murbury.*

**Idaho.**—The mean temperature was 69.1°; the highest was 110°, at Payette on the 11th, and the lowest, 31°, at Swan Valley on the 23d. The average precipitation was 0.51; the greatest monthly amount, 1.44, occurred at Burnside, and the least, trace, at Downey and Idaho City.—*D. P. McCallum.*

**Illinois.**—The mean temperature was 73.8°, or 0.3 above normal; the highest was 100°, at Martinsville on the 22d, and at New Burnside on the 24th, and the lowest, 45°, at Lanark and Scales Mound on the 12th, and at Kishwaukee on the 13th. The average precipitation was 4.41 or 1.69 above normal, and was very unevenly distributed, over 10.00 falling at LaHarpe and Knoxville, while less than 2.00 fell at several stations.—*C. E. Linney.*

**Indiana.**—The mean temperature was 74.2°, or 0.8° above normal; the highest was 99°, at Boonville on the 23d, and at Vincennes and Washington on the 24th, and the lowest, 46°, at Winamac on the 5th. The average precipitation was 3.36, or 0.35 above normal; the greatest monthly amount, 6.85, occurred at Jasper, and the least, 0.94, at Greensburg.—*C. F. R. Wappenhans.*

**Iowa.**—The mean temperature was 71.2°, or nearly normal; the highest was 103°, at Clarinda and Council Bluffs on the 20th, and the lowest, 40°, at Britt on the 1st. The average precipitation was 3.44, being very unequally distributed; the greatest monthly amount, 10.55, occurred at Bonaparte, and the least, 0.58, at Adair.—*G. M. Chappel.*

**Kansas.**—The mean temperature was 78.2°, or 1.9° above normal;

the highest was 108°, at Eureka Ranch on the 20th, at Minneapolis on the 29th, and at Meade on the 31st; the lowest was 46° at Frankfort on the 1st. The average precipitation was 2.46, or 0.63 below normal; the greatest monthly amount, 6.30, occurred at Osage City, while none fell at Hoxie.—*T. B. Jennings.*

**Kentucky.**—The mean temperature was 76.7°, or 1.3° above normal; the highest was 100°, at Paducah and Russellville on the 23d, and the lowest, 55°, at Princeton on the 12th, at Loretto on the 19th, and at Maysville and Owenton on the 28th. The average precipitation was 3.82, or 0.64 above normal; the greatest monthly amount, 9.86, occurred at Alpha, and the least, 1.10, at Woodburn.—*G. E. Hunt.*

**Louisiana.**—The mean temperature was 81.0°, or 0.3° above normal; the highest was 102°, at Liberty Hill on the 18th and 23d, and the lowest, 58°, at Minden on the 31st. The average precipitation was 6.26, or 1.30 above normal; the greatest monthly amount, 14.39, occurred at Venice, and the least, 1.39, at Como.—*A. G. McAdie.*

**Maryland and Delaware.**—The mean temperature was 75.9°, or 2.0° above normal; the highest was 98°, at Boettcherville, and Laurel, Md., on the 31st, and the lowest, 46°, at Deerpark, Md., on the 28th. The average precipitation was 6.27, or 3.79 above normal; the greatest monthly amount, 10.61, occurred at Receiving Reservoir, D. C., and the least, 2.81, at Annapolis, Md.—*F. J. Walz.*

**Michigan.**—The mean temperature was 67.4°, or 1.5° above normal; the highest was 101°, at Owosso on the 23d, and the lowest, 28°, at Newberry on the 19th. The average precipitation was 2.88, or 0.36 below normal; the greatest monthly amount, 5.92, occurred at Gladwin, and the least, 0.75, at Mount Clemens.—*C. F. Schneider.*

**Minnesota.**—The mean temperature was 66.9°, or about normal; the highest was 102°, at Wabasha on the 31st, and the lowest, 33°, at Roseau on the 17th. The average precipitation was 3.22, or about 0.75 above normal; the greatest monthly amount, 6.17, occurred at Montevideo, and the least, 0.86, at Morris.—*T. S. Outram.*

**Mississippi.**—The mean temperature was 80.4°, or 0.4° above normal; the highest was 105°, at Columbus on the 23d, 24th, and 29th, and the lowest, 59°, at French Camp on the 14th. The average precipitation was 5.97, or 2.01 above normal; the greatest monthly amount, 16.95, occurred at Mossport, and the least, 1.83, at Greenwood.—*R. J. Hyatt.*

**Missouri.**—The mean temperature was 75.6°, or about 1.0° above normal; the highest was 103°, at Jefferson City on the 23d, and the lowest, 44°, at Potosi on the 5th. The average precipitation was 3.01, or about normal; the greatest monthly amount, 7.20, occurred at Oto, and the least, 0.40, at Bolckow.—*A. E. Hackett.*

**Montana.**—The mean temperature was 68.0°, or 1.6° above normal; the highest was 105°, at Glendive on the 21st, and the lowest, 31°, at Adel on the 23d. The average precipitation was 0.66, or about normal; the greatest monthly amount, 1.38, occurred at Columbia Falls, and the least, 0.09, at Poplar.—*E. J. Glass.*

**Nebraska.**—The mean temperature was 74.2°, or about normal; the highest was 109°, at Camp Clarke on the 21st, and the lowest, 42°, at Lodgepole on the 9th. The average precipitation was 2.24, or about 0.33 below normal; the greatest monthly amount, 6.85, occurred at Calaway, while none fell at Lodgepole.—*G. A. Loveland.*

**Nevada.**—The mean temperature was 73.6°, or about 1.0° above normal; the highest was 112°, at St. Thomas on the 11th, and the lowest, 29°, at Blaine on the 31st. The average precipitation was 0.45, or 0.04 above normal; the greatest monthly amount, 2.85, occurred at Ely, while none fell at a number of stations.—*R. F. Young.*

**New England.**—The mean temperature was 69.6°, or 2.7° above normal; the highest was 95°, at Plymouth, N. H., on the 4th, and the lowest, 33°, at Flagstaff, Me., on the 12th. The average precipitation was 5.67, or 1.62 above normal; the greatest monthly amount, 11.89, occurred at Jefferson, Mass., and the least, 0.70, at North Conway, N. H.—*J. W. Smith.*

**New Jersey.**—The mean temperature was 74.8°, or 2.7° above normal; the highest was 98°, at Imlaytown on the 31st, and the lowest, 42°, at Charlotteburg on the 28th. The average precipitation was 5.36, or 1.52 above normal; the greatest monthly amount, 9.28, occurred at Camden, and the least, 2.70, at Barnegat Lighthouse.—*E. W. McGann.*

**New Mexico.**—The mean temperature was 71.0°, or 2.6° below normal; the highest was 99° at Gila on the 14th, and the lowest, 34°, at Winsors on the 26th. The average precipitation was 2.27, or 0.28 below

normal; the greatest monthly amount, 4.77, occurred at Laluz, and the least, 0.17, at Lordsburg.—*R. M. Hardinge.*

*New York.*—The mean temperature was 70.3°, or 2.5° above normal; the highest was 94°, at Brentwood on the 8th, and at Penn Yan, Waverly, Wedgewood, and Willets Point on the 31st; the lowest was 35°, at New Lisbon, and South Kortright on the 28th. The average precipitation was 6.07, or 2.34 above normal; the greatest monthly amount, 13.79, occurred at Littlefalls, and the least, 2.10, at Appleton.—*R. G. Allen.*

*North Carolina.*—The mean temperature was 77.2°, or about 1.5° above normal; the highest was 98°, at Sloan on the 1st, and the lowest, 52°, at Linville on the 5th. The average precipitation was 7.94, or 2.16 above normal; the greatest monthly amount, 16.93, occurred at Horse Cove, and the least, 3.12, at Kittyhawk.—*C. F. von Herrmann.*

*North Dakota.*—The mean temperature was 65.4°, or 0.7° below normal; the highest was 104°, at Dickinson on the 15th, and at Medora on the 20th, and the lowest, 24°, at Fort Yates on the 12th. The average precipitation was 1.84, or 0.26 below normal; the greatest monthly amount, 4.05, occurred at Wahpeton, and the least, trace, at Glenullin and Medora.—*B. H. Bronson.*

*Ohio.*—The mean temperature was 73.5°, or 2.2° above normal; the highest was 100°, at Seaman on the 31st, and the lowest, 40°, at Bement on the 28th. The average precipitation was 4.50, or 1.65 above normal; the greatest monthly amount, 9.06, occurred at Clarksville, and the least, 1.38, at Montpelier.—*J. Warren Smith.*

*Oklahoma.*—The mean temperature was 78.9°; the highest was 107°, at Kemp on the 22d, and the lowest, 52°, at Anadarko on the 13th. The average precipitation was 3.26; the greatest monthly amount, 8.97, occurred at Newkirk, while none fell at Beaver.—*J. I. Widmeyer.*

*Oregon.*—The mean temperature was 68.2°, or 2.3° above normal; the highest was 119°, at Pendleton on the 10th, and the lowest, 30°, at Prineville on the 30th. The average precipitation was 0.36, or 0.01 below normal; the greatest monthly amount, 1.94, occurred at Ashland, and the least, trace, at several stations.—*B. S. Pague.*

*Pennsylvania.*—The mean temperature was 72.3°, or 2.8° above normal; the highest was 99°, at Derry Station on the 8th, and the lowest, 37°, at Dushore on the 20th. The average precipitation was 6.60, or 2.45 above normal; the greatest monthly amount, 11.32, occurred at Girardville, and the least, 3.72, at Scranton.—*T. F. Townsend.*

*South Carolina.*—The mean temperature was 78.7°, or about normal; the highest was 99°, at Batesburg on the 25th, and the lowest, 57°, at Clemson College on the 4th. The average precipitation was 9.81, or 3.63 above normal; the greatest monthly amount, 24.68, occurred at Port Royal, and the least, 4.28, at Gaffney.—*J. W. Bauer.*

*South Dakota.*—The mean temperature was 71.0°, or about normal; the highest was 110°, at Shiloh on the 27th, and the lowest, 32°, at Rochford on the 24th. The average precipitation was 1.21, or 1.28 below normal; the greatest monthly amount, 3.00, occurred at Chandler, and the least, 0.05, at Spearfish.—*S. W. Glenn.*

*Tennessee.*—The mean temperature was 76.9°, or slightly above normal; the highest was 99°, at Savannah on the 24th, and the lowest, 50°, at Erasmus on the 29th. The average precipitation was 4.00, or

slightly above normal; the greatest monthly amount, 8.32, occurred at Carthage, and the least, 0.83, at Chattanooga.—*H. C. Bate.*

*Texas.*—The mean temperature for the State during the month, determined by comparison of 36 stations distributed throughout the State, was 0.5° above the normal. There was a slight deficiency in temperature over west Texas and the east coast district. It was about normal over the western portion of the coast district and the panhandle, while there was a general excess over the other portions of the State, with the greatest, 3.4°, in the vicinity of Hearne. The highest was 106°, at Rhineland on the 18th, and the lowest, 49°, at Midland on the 15th. The average precipitation for the State, during the month, determined by comparison of 38 stations distributed throughout the State, was 0.18 below the normal. There was a slight deficiency over west, central, and southwest Texas, and it ranged from 1.07 to 2.63 below normal over the west coast district. The precipitation was generally above the normal over other portions of the State, with the greatest excess over north Texas, where it ranged from 1.28 to 3.18, with the greatest in the vicinity of Gainesville. The greatest monthly amount, 7.77, occurred at Brazoria, and the least, trace, at Corpus Christi and Point Isabel.—*I. M. Cline.*

*Utah.*—The mean temperature was 73.5°, or about 3.0° above normal; the highest was 110°, at St. George on the 11th, and the lowest, 26°, at the same station on the 4th. The average precipitation was 0.60, or slightly below normal; the greatest monthly amount, 1.50, occurred at Pاره, and the least, trace, at Promontory.—*J. H. Smith.*

*Virginia.*—The mean temperature was 76.2°, or about 2.0° above normal; the highest was 99°, at Doswell on the 1st, and the lowest, 51°, at Burkes Garden on the 27th, 28th, and 30th. The average precipitation was 5.48, or 1.89 above normal; the greatest monthly amount, 10.61, occurred at Charlottesville, and the least, 1.25, at Tobaccoville.—*E. A. Evans.*

*Washington.*—The mean temperature was 68.0°, or 2.7° above normal; the highest was 115°, at Kennewick on the 10th, and the lowest, 37°, at Blaine on the 15th. The average precipitation was 0.48, or slightly below normal; the greatest monthly amount, 1.43, occurred at Fort Spokane, and the least, 0.01, at Lyle.—*G. N. Salisbury.*

*West Virginia.*—The mean temperature was 73.7°; the highest was 96°, at Bluefield on the 24th, and the lowest, 44°, at Morgantown and Oldfields on the 28th. The average precipitation was 7.51, or about 3.50 above normal; the greatest monthly amount, 11.57, occurred at Philippi, and the least, 4.40, at Green Sulphur Springs.—*C. M. Strong.*

*Wisconsin.*—The mean temperature was 67.3°, or nearly normal; the highest was 99°, at Spooner on the 31st, and the lowest, 30°, at North Crandon on the 27th. The average precipitation was 3.20, or 0.58 above normal; the greatest monthly amount, 6.02, occurred at Whitemound, and the least, 0.23, at Eau Claire.—*W. M. Wilson.*

*Wyoming.*—The mean temperature was 67.9°, or 1.3° above normal; the highest was 105°, at Bittercreek on the 10th, and the lowest, 32°, at the same station on the 25th. The average precipitation was 0.82, or 0.07 below normal; the greatest monthly amount, 2.05, occurred at Fort Yellowstone, and the least, trace, at Otto.—*W. S. Palmer.*

## SPECIAL CONTRIBUTIONS.

### HANN'S HANDBOOK OF CLIMATOLOGY.

By Prof. M. W. HARRINGTON.

The second edition of this handbook of climatology bears evidence of the well-known industry and care of its learned author. Reductions of the extensive observations of others are given in very condensed form, requiring many hours for their preparation, and the book is filled with similar evidences of painstaking condensation from all sources. There is no evidence of a reduction of Professor Hann's activity, though past middle life, for this edition is fully one-half larger than the first edition, issued fifteen years ago.

It is about ten years since the Atlas of Meteorology was contributed by the same author as a part of the new edition of Berghaus' great Physical Atlas. A keen judgment of both the consistency of climatology and the accuracy of this book can be made by comparing the graphic delineations of ten years ago with the printed statements in the book. On trying it for a certain tropical island of great interest just now to the United States, it was found that the consistency of the two was great, though not absolute. It was near enough to show that our knowledge of the climate of the earth has been already worked out into a systematic web of woof and warp,

where only the finer details are to be filled in hereafter. Yet it remains true that there are large parts of the earth's surface where an increase in our knowledge is much needed. Doctor Hann laments especially the scantiness of observations over the greater part of South America. Though the continent is covered by a series of civilized states, yet only southern Brazil, Argentina, and Chile have a regular system of observations, while elsewhere we must depend on the statements of travelers and an occasional series of observations by immigrants of scientific tastes. According to the author, Africa is better covered by the observed facts of climate than is the most of South America. The information from central Africa is, however, still scanty, as is that from the eastern Sahara and the eastern horn of the continent. In Asia our sources of information are more abundant, but observations from Thibet and interior China are yet very meager.

In the West Indies the information is much more complete, and Jamaica is as well known climatologically as most of the States of the Union. Many of the other islands have each a station with a series of years of observations behind it. Hawaii has long had systematic meteorological observers, and since 1890 has had its own weather bureau, under the surveyor general. In the Philippines we have yet only the